

### **ABSTRACT OF THE DISCLOSURE**

A graceful shutdown technique modifies a routing protocol to allow an intermediate node, such as a router, to announce to its peer routers (peers) its intention to be gracefully shutdown and removed from service in a network. By announcing its intention to  
5 be removed from service, the shutdown router closes (terminates) all connections with its peers and all original routes advertised on those connections are removed (withdrawn) from service. According to the inventive technique, the shutdown router may continue forwarding packets over the network for a “grace” period of time, i.e., the router maintains the validity of those original routes so that packets mapped to the routes are not  
10 dropped (at least during the grace period). The grace period also allows backup paths to be propagated to each peer and put into service prior to a final withdrawal of the shutdown router’s paths from a forwarding information base of the peer. Thus, the grace period enables the network to continue using the shutdown router as a next hop as it converges to use the alternate, backup paths.